corresponding to an amount of said photoelectrically generated electrons detected.

2. (Amended) An exposure apparatus according to claim 1, further including:

a. an exposure dose calculation apparatus, electrically connected to said detection apparatus, for calculating based on said first output signal, an exposure dose of the X-rays at the mask and capable of generating a second output signal corresponding to the exposure dose; and

a1 cont.

b. an X-ray limiting apparatus electrically connected to said exposure dose calculation apparatus, for controlling the illumination of the X-rays based on said second output signal.

3. (Amended) An exposure apparatus according to claim 1, further including:

a. an exposure dose calculation apparatus, electrically connected to said detection apparatus, for calculating based on said first output signal, an exposure dose of the X-rays at the photosensitive substrate and capable of generating a second output signal corresponding to the exposure dose; and

b. an X-ray limiting apparatus electrically connected to said exposure dose calculation apparatus, for controlling the illumination of the X-rays based on said second output signal.

4. (Amended) An exposure apparatus according to claim 1, further including:

a detection unit electrically connected to said detection apparatus so as to detect a deterioration of said at least one of said reflective surfaces with respect to an optical characteristic .

a2

6. (Amended) The exposure apparatus according to claim 1, wherein said at least one of said reflective surfaces further comprises a film made of a material selected from one or more materials from the group of materials consisting of: molybdenum, ruthenium, rhodium, silicon and silicon oxide.

7. (Amended) An exposure apparatus according to claim 5, wherein said detection apparatus further comprises an electrode member having a positive electric potential with respect to said ground and is arranged in the vicinity of said at least one of said reflective surfaces.

a2 cont.

10. (Amended) An exposure apparatus for exposing a pattern present on a mask onto a photosensitive substrate, comprising:

a. an X-ray radiation source that generates X-rays;

b. an illumination optical system that guides said X-rays to the mask;

c. a projection optical system having a plurality of reflective surfaces arranged so as to transfer the mask pattern onto the photosensitive substrate; and

d. a detection apparatus electrically connected to at least one of said reflective surfaces and designed to detect photoelectrically generated electrons from said at least one of said reflective surfaces when said at least one of said reflective surfaces is irradiated with said X-rays, and to provide a first output signal corresponding to an amount of said photoelectrically generated electrons detected.

a3

12. (Amended) The exposure apparatus according to claim 10, wherein said at least one of said reflective surfaces further comprises a film made of a material selected from one or more materials from the group of materials consisting of: molybdenum, ruthenium, rhodium, silicon and silicon oxide.

a4

13. (Amended) An exposure apparatus comprising:

a. an X-ray radiation source that generates X-rays;

b. an optical system disposed in an optical path to receive said X-rays and that guides said X-rays to a mask having a pattern, and then to a photosensitive substrate so as to form on the photosensitive substrate the pattern of the mask, said optical system including a plurality of optical elements, at least one of

said optical elements exhibits a photoelectric effect upon irradiation by said X-rays; and

c. a detection apparatus arranged relative to said at least one of said optical elements so as to detect photoelectrically generated electrons from said at least one of said optical elements, and which provides a first output signal corresponding to an amount of said photoelectrically generated electrons detected.

16. (Amended) An exposure apparatus according to claim 13, further including:

a detection unit electrically connected to said detection apparatus so as to detect a deterioration of said at least one of said optical elements with respect to an optical characteristic.

17. (Amended) An exposure apparatus according to claim 13, further including:

a. a deformation quantity calculation apparatus that calculates an amount of deformation of at least one of said optical elements based on said first output signal, and which generates a second output signal corresponding to said amount of deformation;

b. an adjustment quantity calculation apparatus, electrically connected to said deformation quantity calculation apparatus, that calculates an amount of adjustment of said at least one of said optical elements necessary to eliminate said amount of deformation based on said second output signal, and generates a third output signal corresponding to said amount of adjustment; and

c. an adjustment apparatus, electrically connected to said adjustment quantity calculation apparatus, that adjusts said at least one of said optical elements based on said third output signal, so as to correct said amount of deformation of said at least one of said optical elements.

19. (Amended) An exposure apparatus according to claim 18, wherein said detection apparatus further comprises an electrode member having a positive electric potential with respect to said ground and is arranged in the vicinity of said at least one of said optical elements.

20. (Amended) An exposure apparatus according to claim 13, further including:

a. a mask stage capable of holding the mask;

b. a substrate stage capable of holding the photosensitive substrate;

c. a projection optical system arranged in an optical path formed between said mask stage and said substrate stage, said projection optical system is included in said optical system; and

d. a drive apparatus capable of moving said mask stage and said substrate stage relative to said projection optical system.

Please add the following claims 32-50:

--32. (Added) A method for manufacturing a semiconductor device, comprising:

guiding X-rays to a mask with a pattern by using an optical system, said optical system including a plurality of reflective surfaces that form an illumination field onto the mask;

detecting photoelectrically generated electrons from at least one of said reflective surfaces when said at least one of said reflective surfaces is irradiated with the X-rays; and

transferring the mask pattern onto a photosensitive substrate.--

--33. (Added) A method according to claim 32, further comprising the step of obtaining a change of a characteristic that is necessary to perform said transferring step, based on a detecting information from said detecting step.--

--34. (Added) A method according to claim 33, further comprising the steps of:

calculating an exposure dose based on obtaining information from said obtaining step; and

controlling the exposure dose based on a calculating information from said calculating step.--

--35. (Added) A method according to claim 33, further comprising the steps of:

calculating an amount of deformation with respect to at least one of said plurality of reflective surfaces; and

adjusting said at least one of said plurality of reflective surfaces based on said calculating step.--

--36. (Added) A method according claim 33, wherein said obtaining step includes the step of obtaining a deterioration of an optical characteristic with respect to at least one of said plurality of reflective surfaces.--

--37. (Added) A method for manufacturing a semiconductor device, comprising:

guiding X-rays to a photosensitive substrate by using an optical system, said optical system including a plurality of reflective surfaces that form an exposure field onto the photosensitive substrate;

detecting photoelectrically generated electrons from at least one of said reflective surfaces when said at least one of said reflective surfaces is irradiated with the X-rays; and

transferring a pattern formed on a mask onto the photosensitive substrate.--

--38. (Added) A method according to claim 37, further comprising the step of obtaining a change of a characteristic that is necessary to perform said transferring step, based on a detecting information from said detecting step.--

--39. (Added) A method according to claim 37, wherein said optical system is a projection optical system projecting an image of the pattern formed on the mask onto the photosensitive substrate.--

--40. (Added) A method according to claim 37, wherein said optical system includes an illumination system illuminating the mask with X-rays and a projection optical system projecting an image of the pattern formed on the mask onto the photosensitive substrate.--

--41. (Added) A method for manufacturing a semiconductor device, comprising:

guiding X-rays to a photosensitive substrate by using a projection system, said projection system including a plurality of reflective surfaces that form an image of a pattern formed on a mask onto the photosensitive substrate;

detecting photoelectrically generated electrons from at least one of said reflective surfaces when said at least one of said reflective surfaces is irradiated with the X-rays; and

transferring the pattern formed on the mask onto the photosensitive substrate by using said projection system.--

--42. (Added) A method according to claim 41, further comprising the step of obtaining a change of a characteristic that is necessary to perform said transferring step, based on a detecting information from said detecting step.--

--43. (Added) An exposure apparatus comprising:

an optical system guiding X-rays to a photosensitive substrate so as to transfer a pattern of a mask onto the photosensitive substrate, said optical system comprising a plurality of optical members; and

a detecting apparatus that detects a deterioration of an optical characteristic based on a photoelectric information generated from a film of at least one of said plurality of optical members.--

--44. (Added) A method for manufacturing a semiconductor device, comprising:

guiding X-rays to a photosensitive substrate through an optical system comprising a plurality of optical members;

detecting a deterioration of an optical characteristic based on a photoelectric information generated from a film of at least one of said plurality of optical members; and

transferring a pattern formed on a mask onto the photosensitive substrate.--

--45. (Added) An exposure apparatus according to claim 1, wherein said optical system further includes a reflective integrator including a first plurality of mirror elements and a second plurality of mirror elements receiving X-rays reflected by said first plurality of mirror elements.--

--46. (Added) An exposure apparatus according to claim 10, wherein said illumination optical system further includes a reflective integrator including a first plurality of mirror elements and a second plurality of mirror elements receiving X-rays reflected by said first plurality of mirror elements.--

--47. (Added) A method according to claim 32, wherein said optical system further includes a reflective integrator including a first plurality of mirror elements and a second plurality of mirror elements receiving X-rays reflected by said first plurality of mirror elements.--

--48. (Added) A method according to claim 37, wherein said optical system further includes a reflective integrator including a first plurality of mirror elements and a second plurality of mirror elements receiving X-rays reflected by said first plurality of mirror elements.--

--49. (Added) An exposure apparatus according to claim 43, wherein said optical system further includes a reflective integrator including a first plurality of mirror elements and a second plurality of mirror elements receiving X-rays reflected by said first plurality of mirror elements.--

--50. (Added) A method according to claim 44, wherein said optical system further includes a reflective integrator including a first plurality of mirror elements and a second